

WHAT IS CLAIMED IS:

1. An image forming apparatus, comprising:

a photosensitive member;

a light source;

an optical unit configured to scan a surface of the photosensitive member with a light beam produced by the light source;

a sensor disposed at a side of the photosensitive member and configured to detect a light amount of the light beam from the light source at the side of the photosensitive member before the light beam scans an image region in a main scanning direction on the photosensitive member, and the sensor outputs a detected signal based on the detected light beam;

an electronic circuit configured to store data information and to produce a corrected signal based on a correction data table containing light amount data of the light source corresponding to various image forming conditions and a start position shift amount data; and

a controller unit configured to control a light amount of the light source based on the correction data table, wherein

a start position on the photosensitive member of the light beam produced by the light source is adjusted based on the detected signal and the corrected signal, and

the controller unit further configured to shift the start position of the light beam on the photosensitive member for image recording when the light amount of the light source detected by the sensor changes from a reference value.

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Related Pending Application

Related Case Serial No: 10/197,892

Related Case Filing Date: 07-19-02

2. An image forming apparatus as in Claim 1, wherein the electronic circuit comprises a memory.

3. An image forming apparatus as in Claim 1, wherein the controller unit comprises a write start position correction unit configured to shift the start position of the image recording of the light beam on the photosensitive member based on the start position shift amount data from the correction data table.

4. An image forming apparatus as in Claim 3, wherein the write start position correction unit shifts the start position of image recording in first and second stages, the first stage shifting the start position by a unit of a pixel dot, and the second stage shifting the start position by a unit smaller than a pixel dot.

5. An image forming apparatus as in Claim 4, wherein the write start position correction unit generates a timing signal for determining a timing to load the image data.

6. An image forming apparatus as in Claim 4, wherein the write start position correction unit shifts the start position of the image recording based on a difference of light amount between an actual light and a predetermined reference light.

7. An image forming apparatus as in Claim 4, wherein the write start position correction unit shifts the start position of the image recording based on a difference of light amount between an actual light and a reference light that is determined when a write start position in the main scanning direction on the photosensitive member is adjusted through an image forming onto the photosensitive member.

8. An image forming apparatus as in Claim 1, wherein the start position shift amount data stored in the electronic circuit is changed.

9. An image forming apparatus as in Claim 1, wherein the electronic circuit prestores a plurality of different correction data tables each containing light amount data of the light

source determined under various image forming conditions and corresponding start position shift amount data.

10. An image forming apparatus as in Claim 9, further comprising an operator input mechanism configured to allow an operator to input an instruction to select one of the plurality of different correction data tables.

11. An image forming apparatus as in Claim 1, further comprises an image forming mechanism for yellow, magenta, cyan, and black color images, wherein the image forming mechanism includes the photosensitive member, the light source, the optical unit, the sensor, the electronic circuit, and the controller unit.

12. An image forming apparatus as in Claim 11, wherein the optical systems of the image forming mechanisms for yellow, magenta, cyan, and black colors share a common polygon mirror.

13. An image forming apparatus as in Claim 11, wherein the image forming mechanism adjusts the start position of the photosensitive member for light beams corresponding to yellow, magenta, cyan, and black information data.

14. An image forming apparatus as in Claim 11, wherein the image forming mechanism comprises at least four image forming mechanisms, each image forming mechanism producing an image in one color.

15. An image forming apparatus as in Claim 14, wherein the correction data table for each color is predetermined relative to a reference value.

16. An image forming apparatus as in Claim 14, wherein a predetermined value of the light amount for one color constitutes a reference value and other correction data tables for remaining colors are predetermined relative to the reference color.

17. An image forming apparatus as in Claim 1, wherein the corrected signal has a constant time duration under various image forming conditions.

20. An image forming apparatus as in Claim 19, wherein the storage means comprises a memory.

21. An image forming apparatus as in Claim 19, wherein the control means comprises write start position means for shifting the start position of the image recording of the light beam on the photosensitive means based on the start position shift amount data from the correction data table.

22. An image forming apparatus as in Claim 19, wherein the write start position means shifts the start position of image recording in first and second stages, the first stage shifting the start position by a unit of a pixel dot, and the second stage shifting the start position by a unit smaller than a pixel dot.

23. An image forming apparatus as in Claim 19, wherein the write start position means generates a timing signal for determining a timing to load the image data.

24. An image forming apparatus as in Claim 22, wherein the write start position means shifts the start position of the image recording based on a difference of the light amount between an actual light and a predetermined reference light.

25. An image forming apparatus as in Claim 22, wherein the write start position means shifts the start position of the image recording based on a difference of the light amount between an actual light and a reference light that is determined when a write start position in the main scanning direction on the photosensitive means is adjusted through an image forming onto the photosensitive means.

26. An image forming apparatus as in Claim 19, wherein the storage means prestores a plurality of different correction data tables each containing light amount data of the light source determined under various image forming conditions and corresponding start position shift amount data.

27. An image forming apparatus as in Claim 26, further comprising operator input means for allowing an operator to input an instruction to select one of the plurality of different correction data tables.

28. An image forming apparatus as in Claim 19, further comprising image forming means for yellow, magenta, cyan, and black color images, wherein the image forming means includes the photosensitive means, the light source means, the optical means, the sensing means, the storage means, and the control means.

29. An image forming apparatus as in Claim 28, wherein the optical means of the image forming means for yellow, magenta, cyan, and black colors share a common polygon mirror means.

30. An image forming apparatus as in Claim 28, wherein the image forming means adjusts the start position of the photosensitive means for light beams corresponding to yellow, magenta, cyan, and black information data.

31. An image forming apparatus as in Claim 28, wherein the image forming means comprises at least four image forming means, each image forming means producing an image in one color.

32. An image forming apparatus as in Claim 31, wherein the correction data table for each color is predetermined relative to a reference value.

33. An image forming apparatus as in Claim 31, wherein a predetermined value of the light amount for one color constitutes a reference value and other correction data tables for remaining colors are predetermined relative to the reference color.

34. An image forming apparatus as in Claim 19, wherein the corrected signal has a constant time duration under various image forming conditions.

35. An image forming apparatus as in Claim 19, wherein the control means further includes another write start position correction means so that said write start position

correction means shifts the start position of the image recording by one of a unit of a pixel dot and a unit smaller than a pixel dot, and the other write start position correction means shifts the start position of the image recording by the other unit of a pixel dot and a unit smaller than a pixel dot.

36. An image forming apparatus, comprising:

at least one image forming mechanisms configured to form an image based on image data, said image forming mechanism comprising:

an optical system configured to scan a surface of a photosensitive member with a light beam emitted from a light source based on said image data,

a sensor arranged at a predetermined position relative to the photosensitive member and configured to detect the light beam at an initial side before an image region on a scanning line in a main scanning direction and to output a sync detect signal,

a memory configured to store a correction data table containing light amount data of the light source corresponding to various image forming conditions and corresponding to start position shift amount data, and

a controller unit configured to control a light amount of the light source according to image forming conditions and to determine a start position of an image recording based on the sync detect signal detected by the sensor, wherein

the controller includes a write start position correction unit configured to shift the start position of the image recording based on a start position shift amount data from the correction data table when the light amount of the light source is changed under various image forming conditions.

37. An image forming apparatus as in Claim 36, wherein the write start position correction unit shifts the start position of the image recording in first and second stages according to a unit of a pixel dot and a unit smaller than a pixel dot, respectively.

38. An image forming apparatus as in Claim 36, wherein the write start position correction unit generates a signal for determining a timing to load the image data.

39. An image forming apparatus as in Claim 36, wherein the write start position correction unit shifts the start position of the image recording based on a difference of light amount between an actual light and a predetermined reference light.

40. An image forming apparatus as in Claim 36, wherein the write start position correction unit shifts the start position of the image recording based on a difference of light amount between an actual light and a reference light, which is determined when a write start position in the main scanning direction on the photosensitive member is adjusted through image forming onto the photosensitive member.

41. An image forming apparatus as in Claim 36, wherein the start position shift amount data stored in the memory is changed.

42. An image forming apparatus as in Claim 36, wherein the memory prestores a plurality of different correction data tables each containing light amount data of the light source determined under various image forming conditions and corresponding start position shift amount data.

43. An image forming apparatus as in Claim 42, further comprising an operator input mechanism configured to allow an operator to input an instruction to select one of the plurality of different correction data tables.

44. An image forming apparatus as in Claim 36, wherein the at least one image forming mechanism includes image forming mechanisms configured to individually produce yellow, magenta, cyan, and black color images.

45. An image forming apparatus as in Claim 44, wherein the optical systems of the at least one image forming mechanisms including the image forming mechanisms for yellow, magenta, cyan, and black colors share a common polygon mirror.

46. An image forming apparatus, comprising:

at least one image forming means for forming an image based on image data, said image forming means comprising:

optical scanning means for scanning a surface of a photosensitive member with a light beam emitted from a light source based on said image data,

sensing means for detecting the light beam at an initial side before an image region on a scanning line in a main scanning direction on the photosensitive member and to output a sync detect signal,

data storing means for storing a correction data table containing light amount data of the light source determined under various image forming conditions and corresponding start position shift amount data, and

control means for controlling a light amount of the light source according to the image forming conditions and for determining a start position of the image recording based on the sync detect signal detected by the sensing means, wherein

the control means including a write start position correcting means for shifting the start position of the image recording based on a start position shift amount data from the correction data table when the light amount of the light source is changed under various image forming conditions.

47. An image forming apparatus as in Claim 46, wherein the write start position correcting means shifts the start position of the image recording in two stages according to a unit of a pixel dot and a unit smaller than a pixel dot.



48. An image forming apparatus as in Claim 46, wherein the write start position correcting means generates a signal for determining a timing to load the image data.

49. An image forming apparatus as in Claim 46, wherein the write start position correcting means shifts the start position of the image recording based on a difference of light amount between an actual light and a predetermined reference light.

50. An image forming apparatus as in Claim 46, wherein the write start position correcting means shifts the start position of the image recording based on a difference of light amount between an actual light and a reference light, which is determined when a write start position in the main scanning direction is adjusted through image forming onto the photosensitive member.

51. An image forming apparatus as in Claim 46, wherein the start position shift amount data stored in the data storing means is changed.

52. An image forming apparatus as in Claim 46, wherein the data storing means prestores a plurality of different correction data tables each containing light amount data of the light source predetermined under various image forming conditions and corresponding start position shift amount data.

53. An image forming apparatus as in Claim 52, further comprising operator input means for allowing an operator to input an instruction for selecting one of the plurality of different correction data tables.

54. An image forming apparatus as in Claim 46, wherein the at least one image forming means includes image forming means for individually producing yellow, magenta, cyan, and black color images.

55. An image forming apparatus as in Claim 54, wherein the optical scanning means of the at least one image forming means including the image forming means for handling yellow, magenta, cyan, and black color images share a common polygon mirror.

56. A method of image forming, comprising:

separating image data into a plurality of image data streams;

providing a plurality of image forming mechanisms corresponding to the plurality of image data streams;

handling in parallel the plurality of image data streams by the plurality of image forming mechanisms;

scanning by each of the plurality of image forming mechanisms a surface of a photosensitive member with a light beam emitted from a light source in accordance with each of the plurality of image data streams;

detecting by each of the plurality of image forming mechanisms the light beam at an initial side before an image region on a scanning line in a main scanning direction of the photosensitive member and producing a sync detect signal;

storing in each of the plurality of image forming mechanisms a correction data table containing light amount data of the light source determined based on image forming conditions and corresponding start position shift amount data;

controlling in each of the plurality of image forming mechanisms a light amount of the light source under various image forming conditions;

determining in each of the plurality of image forming mechanisms a start position of an image recording in accordance with the sync detect signal detected by the detecting step;  
and

shifting in each of the plurality of image forming mechanisms the start position of the image recording based on a start position shift amount data from the correction data table when the light amount of the light source is changed under various image forming conditions.

57. A method as in Claim 56, wherein the shifting shifts the start position of the image recording in two stages corresponding to a unit of a pixel dot and a unit smaller than a pixel dot.

58. A method as in Claim 56, wherein the shifting generates a signal for determining a timing to load the image data.

59. A method as in Claim 56, wherein the shifting shifts the start position of the image recording based on a difference of the light amount between an actual light and a predetermined reference light.

60. A method as in Claim 56, wherein the shifting shifts the start position of the image recording based on a difference of the light amount between an actual light and a reference light, which is determined when a write start position in the main scanning direction is adjusted through an image forming onto the photosensitive member.

61. A method as in Claim 56, wherein the corresponding start position shift amount data stored in the storing is changed.

62. A method as in Claim 56, wherein the storing prestores a plurality of different correction data tables each containing light amount data of the light source determined under various image forming conditions and corresponding start position shift amount data.

63. A method as in Claim 62, further comprising allowing an operator to input an instruction for selecting one of the plurality of different correction data tables.

64. A method as in Claim 56, wherein the plurality of image forming mechanisms includes image forming mechanisms for individually producing yellow, magenta, cyan, and black color images.

65. A method as in Claim 56, wherein the plurality of image forming mechanisms including the image forming mechanisms for yellow, magenta, cyan, and black color images share a common polygon mirror.

## ABSTRACT

An image forming apparatus includes at least one image forming mechanism  
5 configured to form an image based on image data. Each image forming mechanism includes  
an optical system, a sensor, an electronic circuit, and a controller. The optical system scans a  
photosensitive member with a light beam based on image data. The sensor detects the light  
beam and the electronic circuit stores a correction data table containing light amount data of  
the light source and corresponding start position shift amount data. The controller controls a  
10 light amount of the light source and adjusts a start position of image recording on the  
photosensitive member in accordance with a sync detect signal. The controller includes a  
write start position correction unit that adjust the start position of the image recording based  
on a start position shift amount data when the light amount varies.

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**Fig. 1**  
(PRIOR ART)

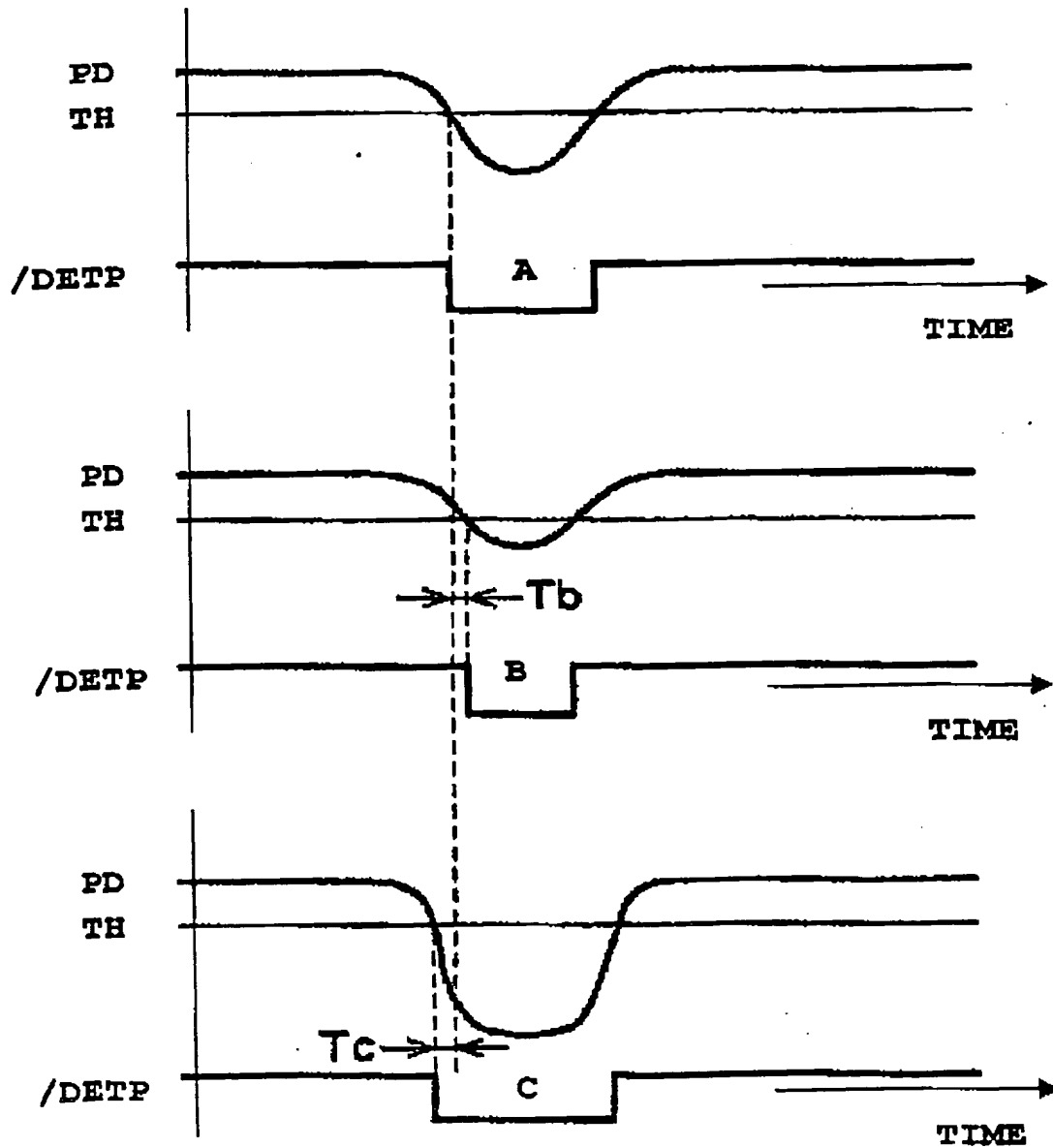




Fig. 4

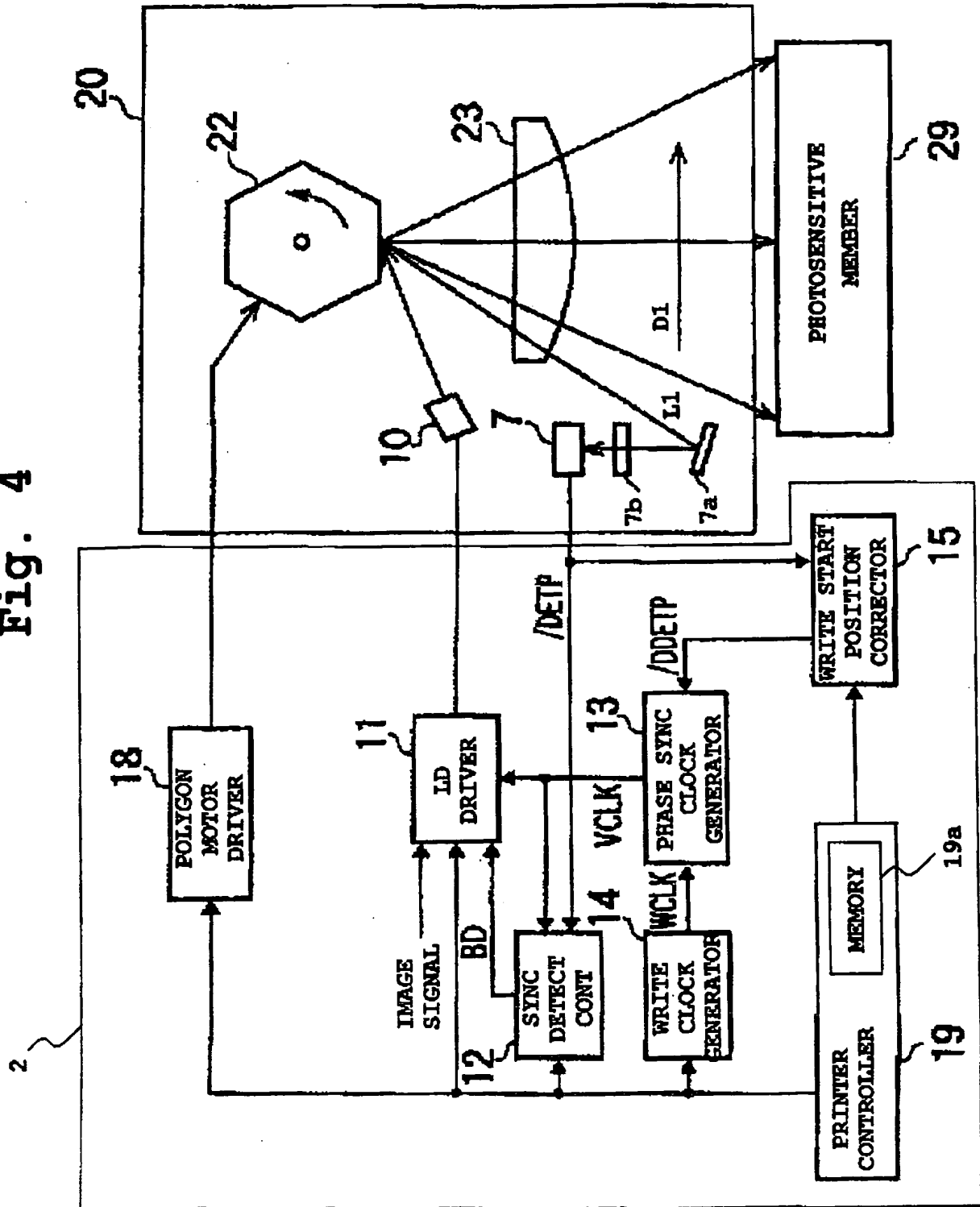




Fig. 5

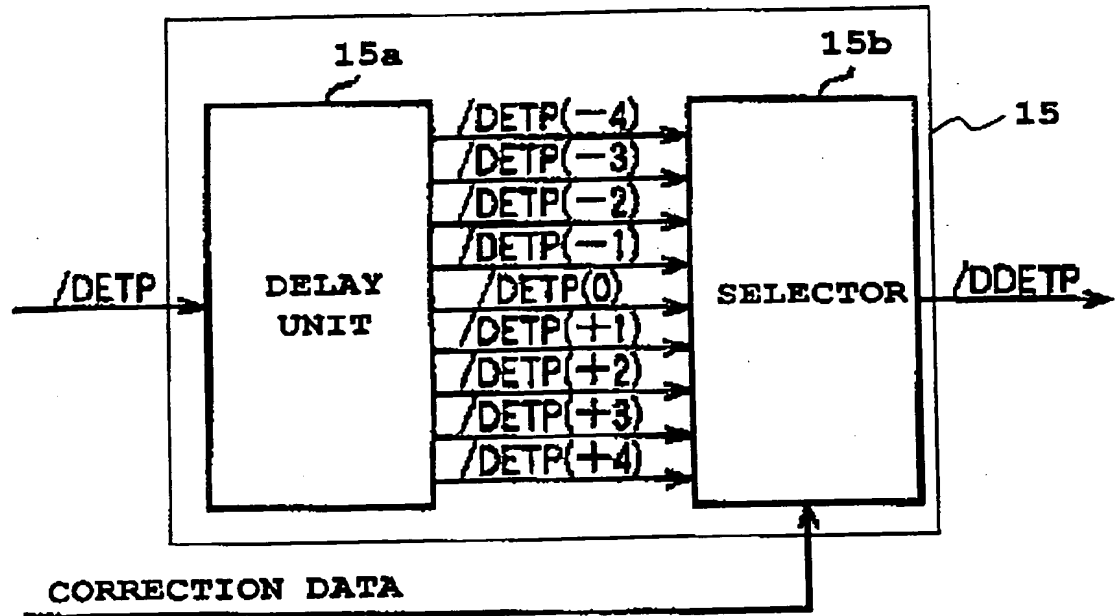


Fig. 6

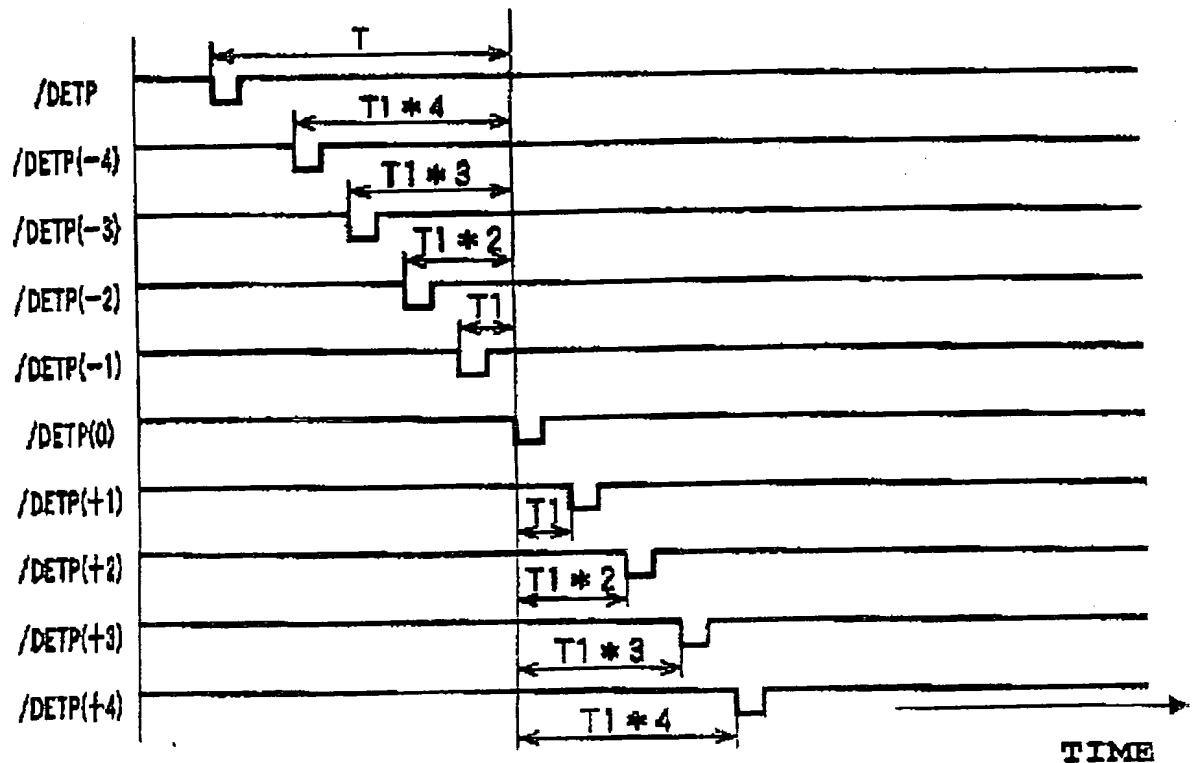


Fig. 7

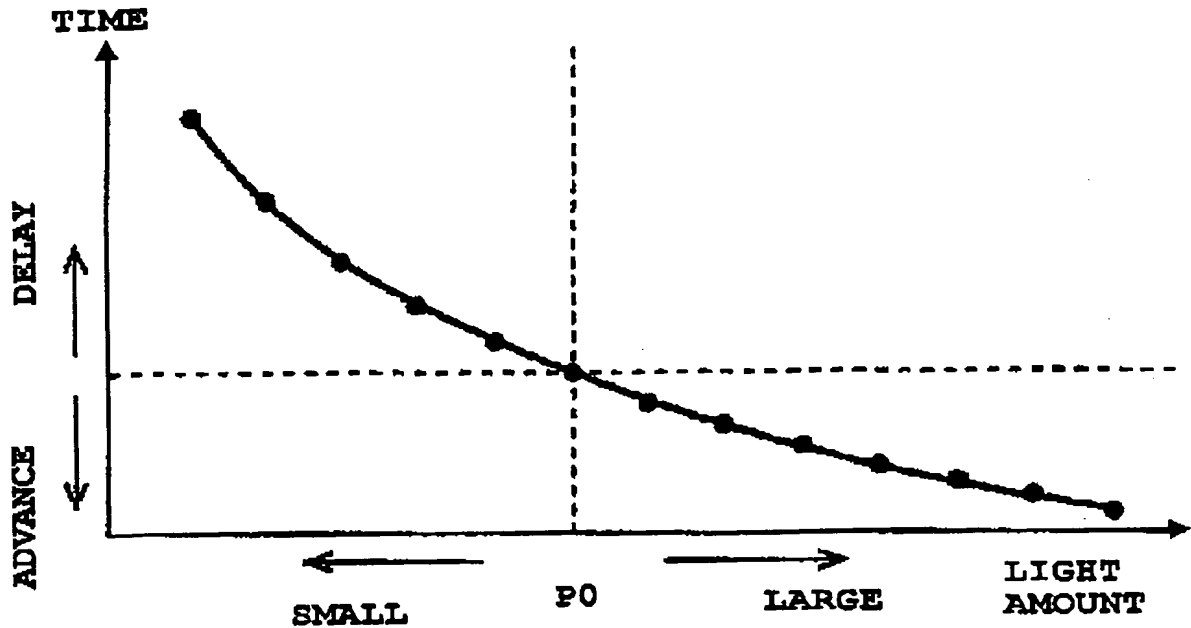


Fig. 8

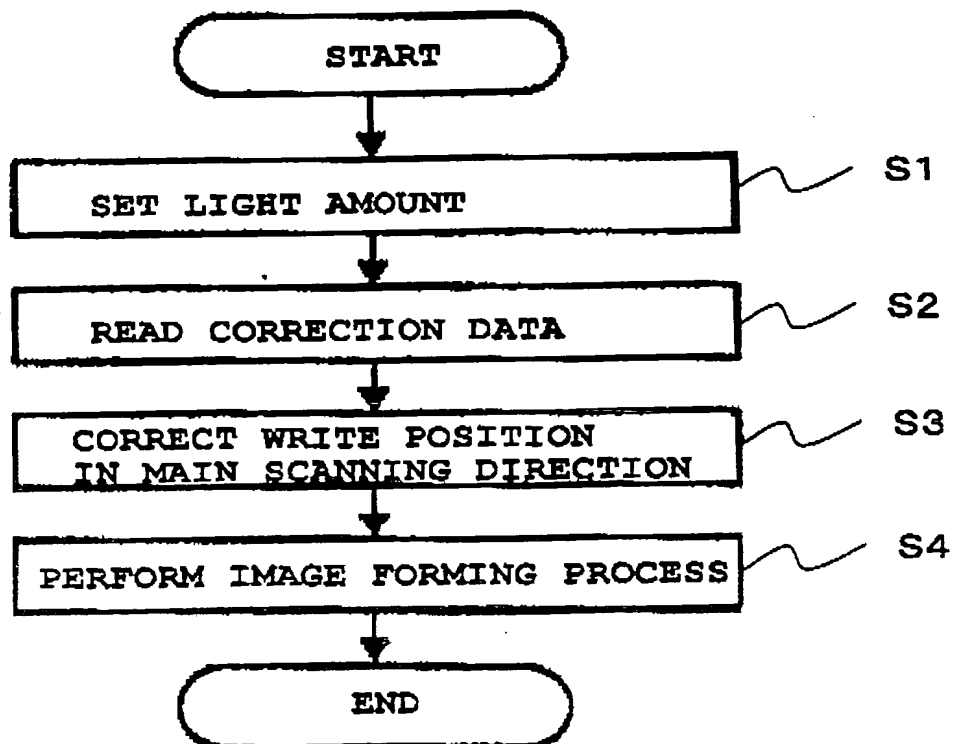


Fig. 9

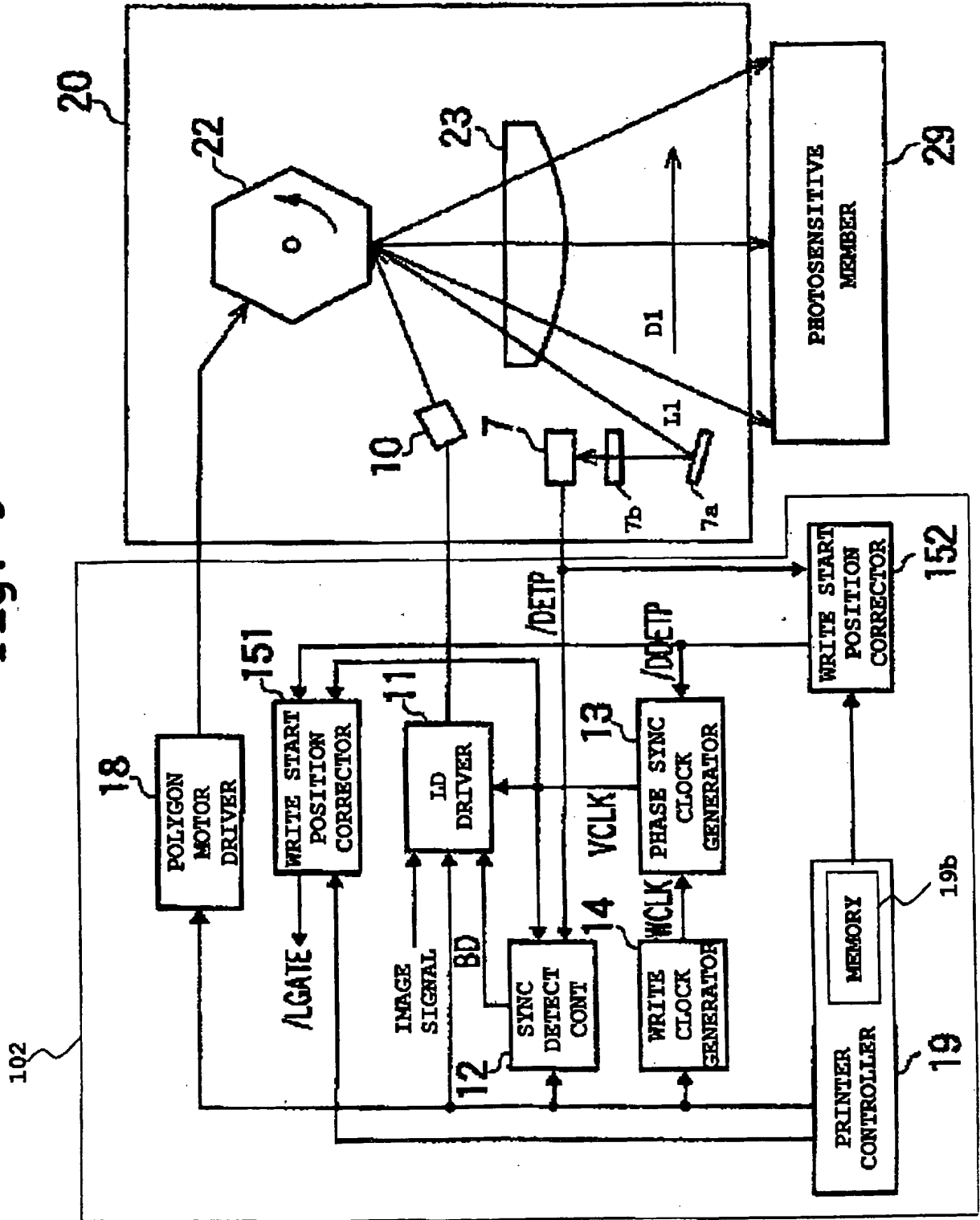


Fig. 10

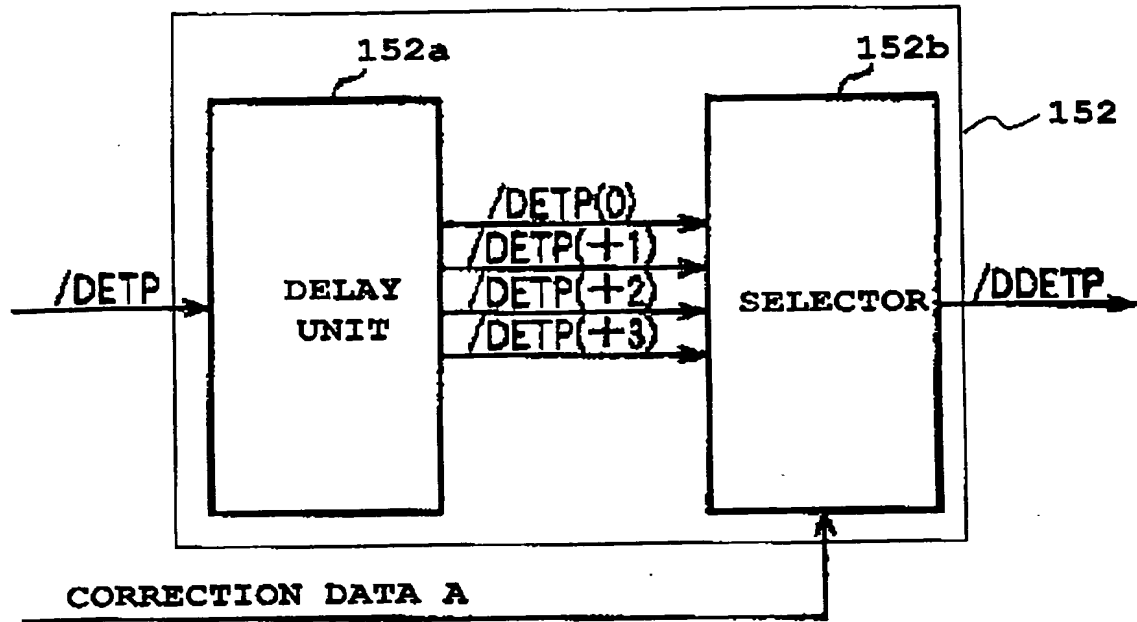


Fig. 11

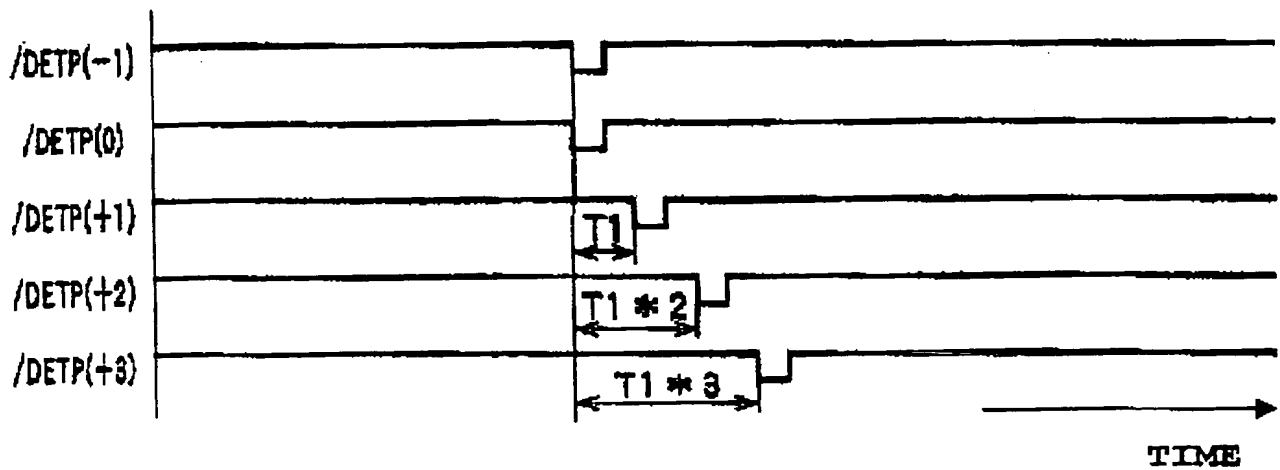


Fig. 12

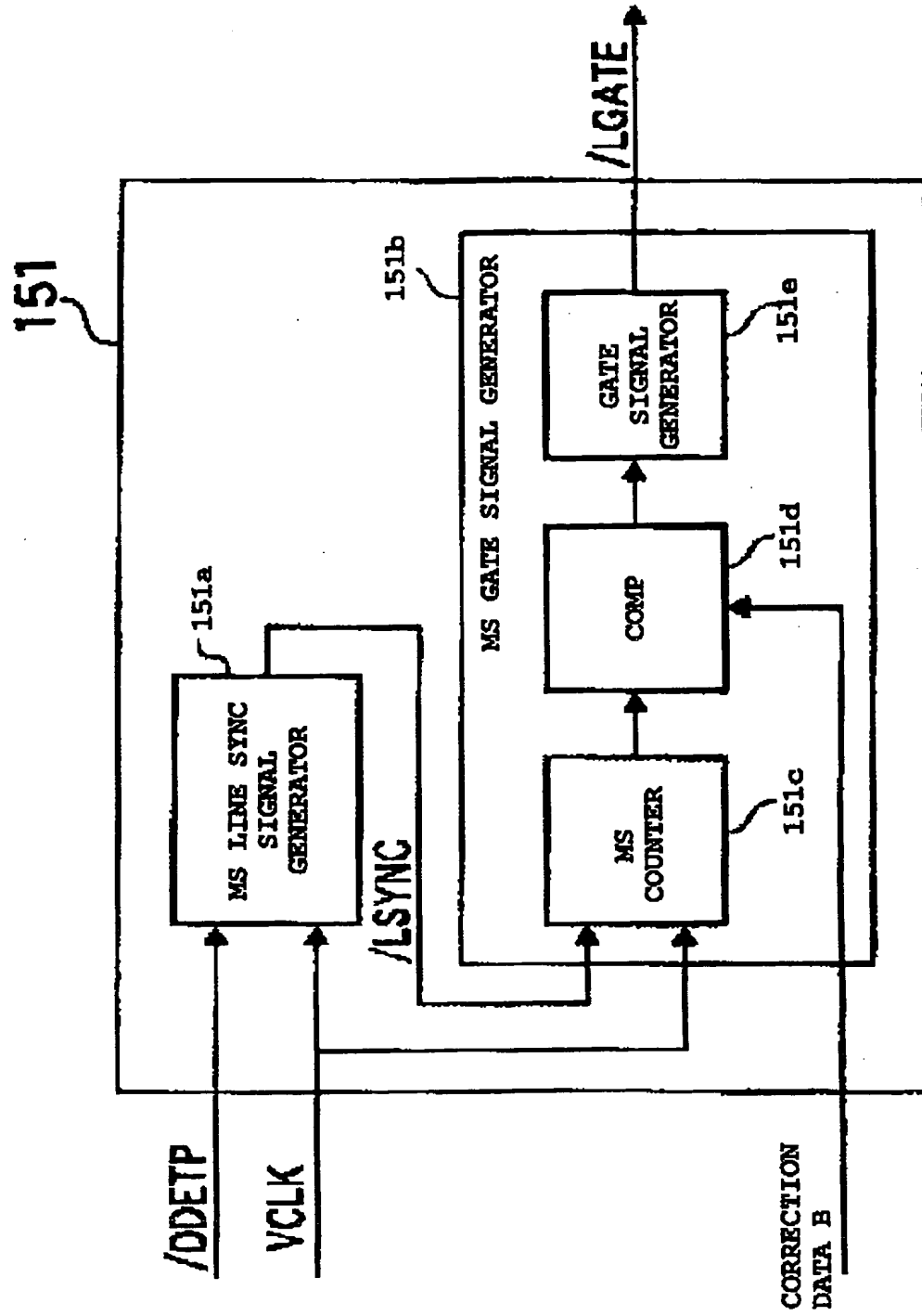


Fig. 13

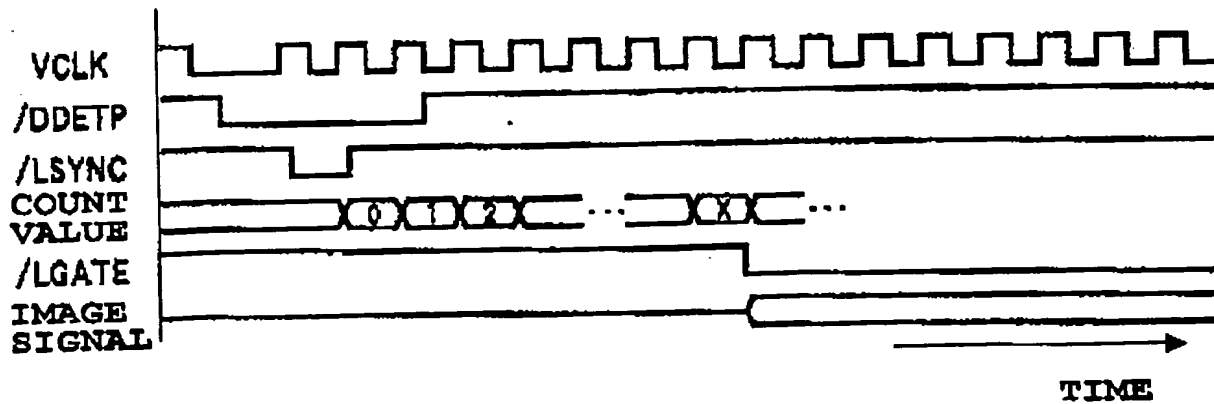


Fig. 14

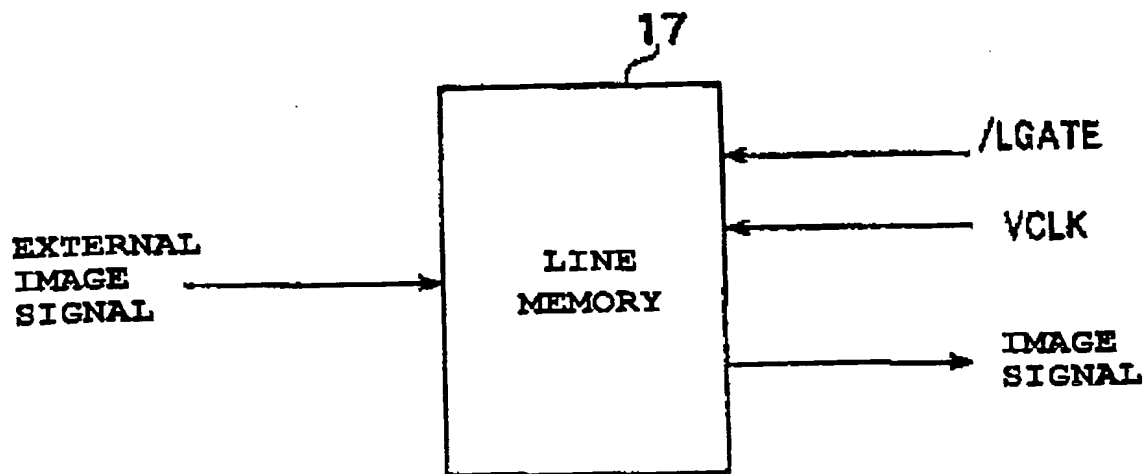


Fig. 15

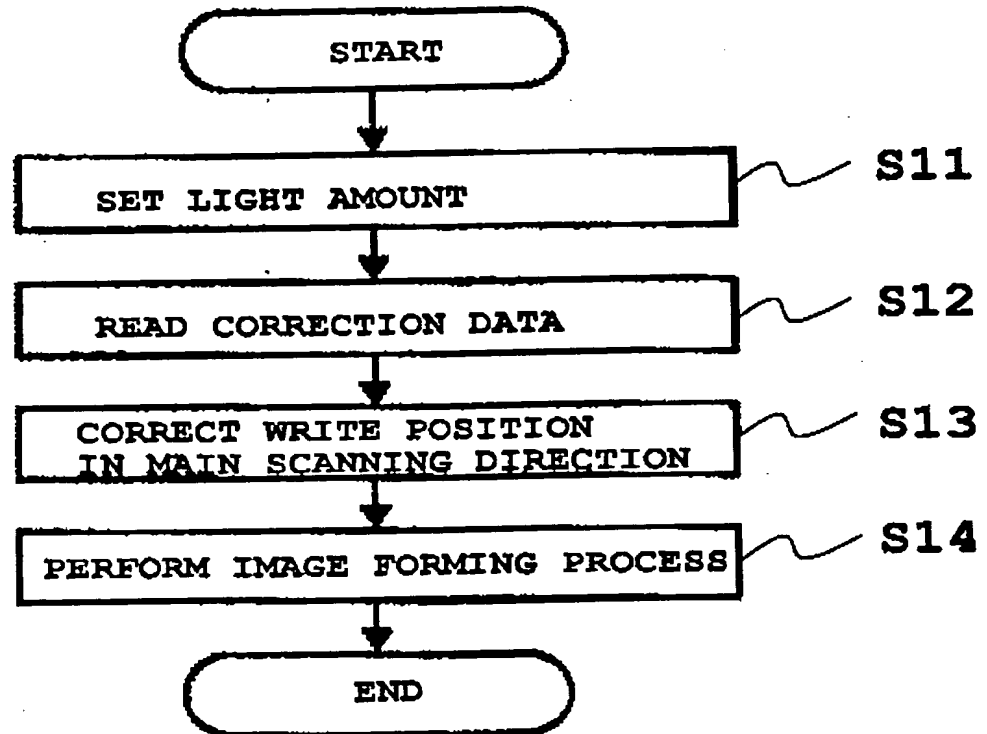


Fig. 16

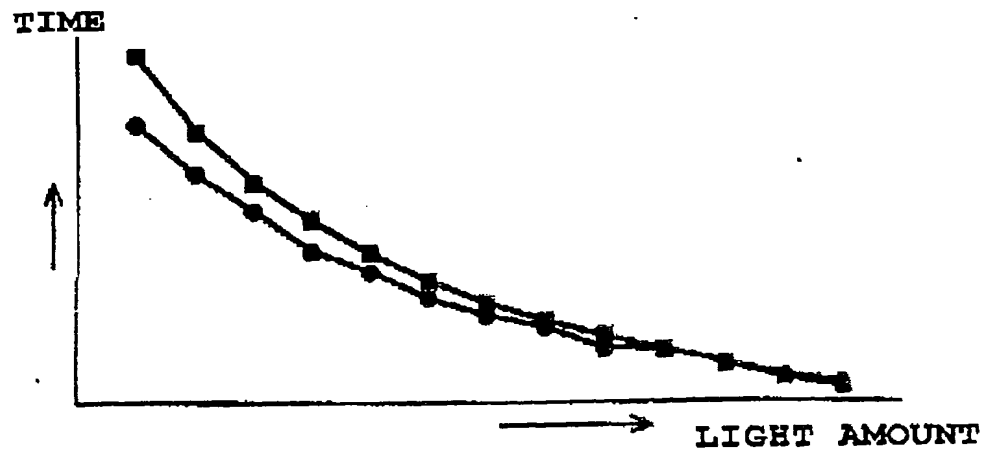


Fig. 17

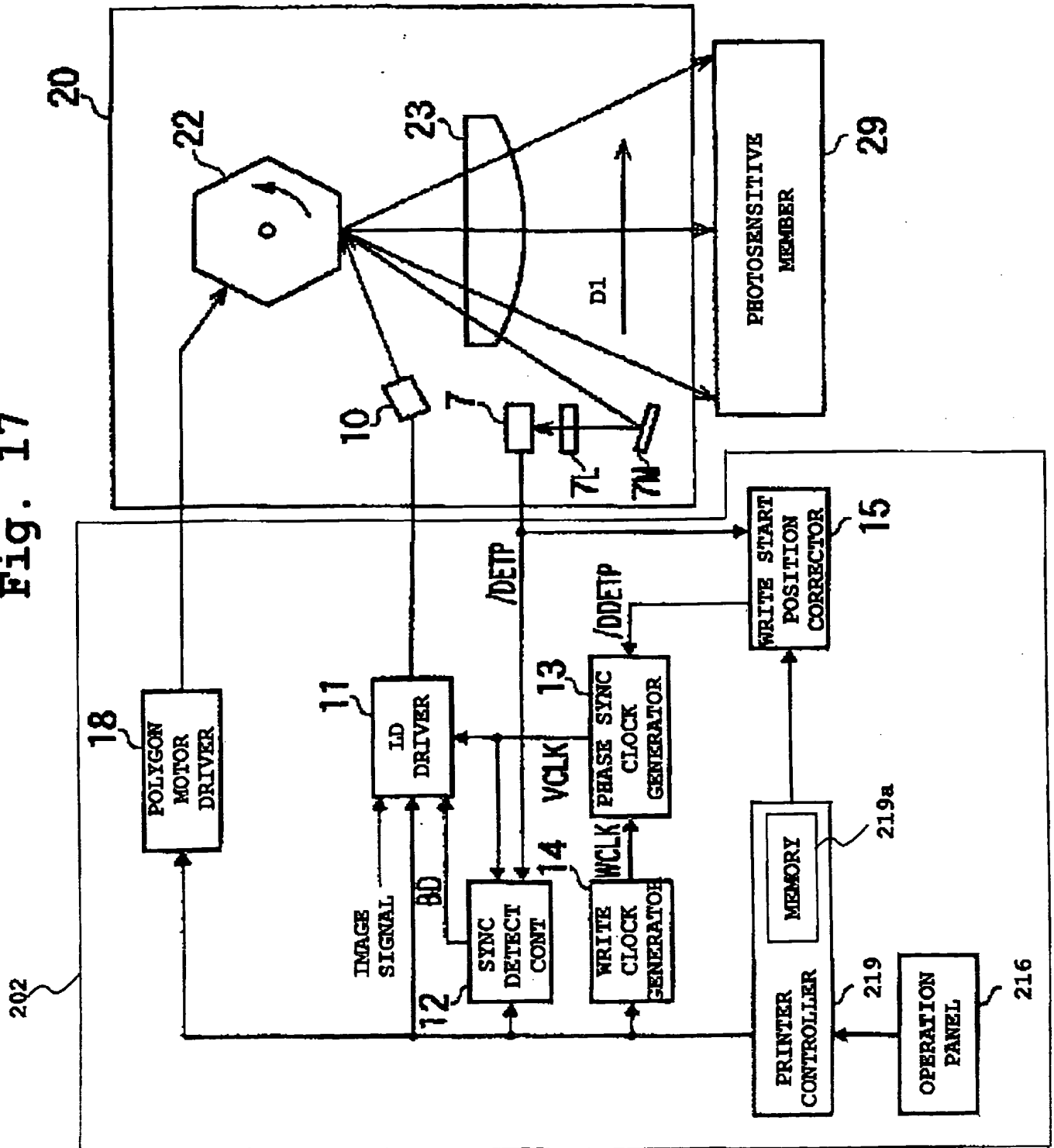




Fig. 18

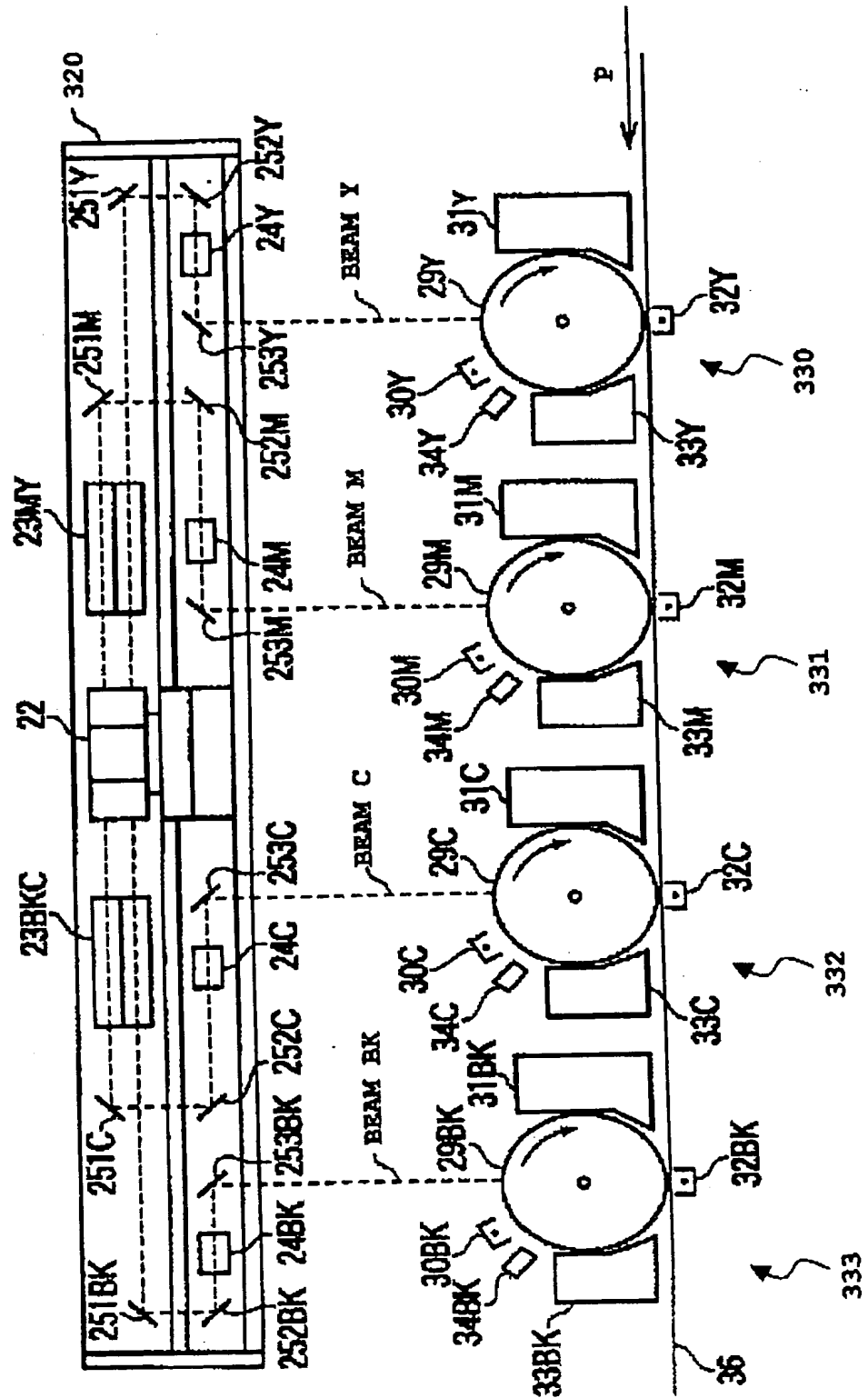


Fig. 19

